CLAIMS

1. A method of carrying out an oxidation reaction catalysed by a monooxygenase enzyme and using hydrogen peroxide as an oxidant, in which reaction a low level of oxidation damage of the monooxygenase occurs, said method comprising producing the hydrogen peroxide simultaneously with the oxidation reaction, wherein the hydrogen peroxide is produced at a rate less than or equal to the rate at which it is used in the reaction.

2. A method according to claim 1, wherein the monooxygenase enzyme has a K_m for H_2O_2 of at least 15nM.

3. A method according to claim 1 or 2, wherein the monooxygenase enzyme is a P450 enzyme.

4. A method according to any one of the preceding claims, wherein the rate of H_2O_2 production is less than or equal to 3 μg per mg of enzyme.

5. A method according to any one of the preceding claims,
wherein the concentration of H_2O_2 throughout the reaction is less than or equal to 1 mM.

6. A method according to any one of the preceding claims, wherein
the reaction continues for at least 240 minutes.

7. A method according to any one of the preceding claims, wherein the H_2O_2 is produced by an electrochemical reaction.

8. A method according to any one of claims 1 to 6, wherein the H_2O_2 is produced by an enzyme reaction.

9. A method according to claim 8, wherein the enzyme is glucose oxidase.

10. A method according to any one of claims 1 to 6, wherein the H_2O_2 is produced by a H_2O_2 precursor.

11. A method according to claim 10, wherein the H_2O_2 precursor is perborate, percarbonate or perphosphate.

12. A method according to any one of the preceding claims, wherein the substrate which is oxidised by the monooxygenase enzyme is an alkane, aromatic compound, terpenoid compound, alkene or fatty acid.

13. Use of electrodes for producing H_2O_2 to drive an oxidation reaction as defined in claim 7.

14. Use of an enzyme for producing H_2O_2 to drive an oxidation reaction as defined in claim 8 or 9.

15. Use of perborate, percarbonate or perphosphate for producing H_2O_2 to drive an oxidation reaction as defined in claim 10.

16. A method of carrying out an oxidation reaction catalysed by a monooxygenase enzyme and using hydrogen peroxide as an oxidant, in which reaction a low level of oxidation damage of the monooxygenase occurs, said method comprising carrying out the reaction in the presence of an H_2O_2 or hydroxyl radical sequestering agent that controls the H_2O_2 or hydroxyl radical concentration.

17. A method according to claim 16, wherein the sequestering agent is EDTA.